

**PARVATHANENIBRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA.**

(An autonomous college in the jurisdiction of Krishna University)

**SEMESTER- IV**

**PAPER- IV**

**TITLE: EMBRYOLOGY, ANIMAL PHYSIOLOGY AND ECOLOGY**

**NO OF HOURS: 60**

**CREDITS: 04**

**WEF: 2018-19**

**COURSE CODE: ZOO T41**

#### **AIM**

- Understanding the biological functions of the body.
- Critical understanding of ecological surroundings, their influence of life, adaptations of organisms to different habitats and the behavior of organisms.

#### **OBJECTIVES**

- The study of fundamentals of embryology
- The study of functional aspects of the body.
- Understanding the mechanism of homeostasis
- Understanding the mechanism of coordination in the body.
- Understanding the structural and functional aspects of an ecosystem.
- Understanding the dynamics of populations

#### **PREREQUISITE**

- Knowledge of embryology studied in Intermediate
- Knowledge of anatomy and basics of physiology of animals acquired in Intermediate
- Basic knowledge of ecology acquired in Intermediate.

#### **COURSE OUTCOMES**

**CO1** Understand the concepts gametogenesis, formation of primary germ layers, Foetal membranes and placenta. PO1, PO2, PO5, PO6, PO7, PSO2

**CO2** Discuss the structure and functions of digestive and respiratory systems, cardiovascular system and Excretory system. PO1, PO2, PO5, PO6, PO7, PSO2

**CO3** Explain the functions of nervous system, Muscle contraction, endocrine systems and reproduction. PO1, PO2, PO5, PO6, PO7, PSO2

**CO4** Evaluate the Physical and chemical factors, Functional aspects of an ecosystem and Animal communities, community interactions. PO1, PO2, PO5, PO6, PO7, PSO2

**CO5** Asses the Habitat Ecology and adaptations, Population Ecology and Zoogeography. PO1, PO2, PO5, PO6, PO7, PSO2

## UNIT I

### 1.0. Embryology

- 1.1. Spermatogenesis, oogenesis and Fertilization. **4 hours**
- 1.2. Types of eggs **1 hour**
- 1.3. Types of cleavages **2 hours**
- 1.4. Development of frog up to gastrulation and formation of primary germ layers **3 hours**
- 1.5. Foetal membranes and their significance in chick embryo **2 hours**
- 1.6. Placenta in mammals: types and functions **2 hours**

## UNIT II

### 2.0 Physiology - I

- 2.1 Digestive system: process of digestion **2 hours**
- 2.2 Absorption of digested food **1 hour**
- 2.3 Respiratory system - Pulmonary ventilation, transport of oxygen and carbon dioxide **4 hours**
- 2.4 Circulatory system - Structure and function of heart, Cardiac cycle. **3 hours**
- 2.5 Excretory system - Structure of nephron, urine formation, and counter current mechanism **4 hours**

## UNIT-III

### 3.0 Physiology - II

- 3.1.1 Nerve impulse - Resting membrane potential, origin and propagation of action potentials along myelinated and non myelinated nerve fibres **3 hours**
- 3.1.2 Muscle contraction - Ultra structure of skeletal muscle fibre, molecular and chemical basis of muscle contraction **3 hours**
- 3.1.3 Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal and pancreas **5 hours**
- 3.1.4 Hormonal control of reproduction in human being **1 hour**

## UNIT IV

### 4.0. Ecology I

- 4.1. Physical and chemical factors of an ecosystem
  - 4.1.1. Pressure **1 hour**
  - 4.1.2. Atmospheric gases: oxygen and carbon dioxide. **2 hours**
- 4.2 Functional aspects of an ecosystem
  - 4.2.1. Biogeochemical cycles: nitrogen cycle, phosphorus cycle and carbon cycle **2 hours**

4.3	Animal communities	
4.3.1	Types of communities	<b>1 hour</b>
4.3.2	Community structure	<b>1 hour</b>
4.3.3	Ecotone and edge effect,	<b>1 hour</b>
4.4	Community interactions	
4.4.1	Prey-predator relationships	<b>2 hours</b>
4.4.2	Competition	<b>1 hour</b>

## UNIT V

### 5.0. Ecology - II

5.1	Habitat Ecology and adaptations	
5.1.1	Ecological habitat and niche	<b>1 hour</b>
5.1.2	Desert adaptations	<b>2 hours</b>
5.1.3	Pelagic adaptations	<b>1hour</b>
5.2.	Population Ecology	
5.2.1	Characteristics of animal populations	<b>2 hours</b>

### 5.3. Zoogeography **3 hours**

5.3.1 Zoogeographical regions: Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions.

### Suggested Readings

1. **Gerard J. Tortora and Sandra Reynolds Garbowski** *Principles of Anatomy and Physiology*, Tenth Ed., John Wiley & Sons
2. **Arthur C. Guyton MD**, *A Text Book of Medical Physiology*, Eleventh ed., John E. Hall, Harcourt Asia Ltd.
3. **William F. Ganong**, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
4. **Sherwood, Klandrof, Yanc**, *Animal Physiology*, Thompson Brooks/Coole, 2005.
5. **Sherwood, Klandrof, Yanc**, *Human Physiology*, Thompson Brooks/Coole, 2005.
6. **Knut Schmidt-Nielson**, *Animal Physiology*, 5<sup>th</sup>ed, Cambridge Low Price Edition.
7. **Roger Eckert and Randal**, *Animal Physiology*, 4<sup>th</sup>ed, Freeman Co, New York.
8. **Balinisky B.I.** *An introduction to Embryology*, 5<sup>th</sup>ed, Thompson Brook, Coole.
9. **McEwen, R.s.** *Vertebrate Embryology*, Oxford and IBH Publishing Co. New Delhi.
10. **M.P.Arora**, 'Ecology' Himalaya Publishing company.
11. **P.D.Sharma**, *Environmental Biology*'.
12. **P.R.Trivedi and Gurdeep Raj**. 'Environmental Ecology'
13. **BuddhadevSarma and Tej Kumar**, *Indian Wildlife Threats and Preservation*
14. **Chapman J.L. and Reiss M.J**, *Ecology Principles and Applications*, Second Ed., Cambridge University Press, London.
15. **Benny Joseph**, *Environmental Studies*, TATA MGrav Hill Com., New Delhi.

16. **Eugene P. Odum**, *Fundamentals of Ecology* Third Ed., Nataraj Publishers, Dehradun.

17. **Balinisky B.I.** *An introduction to Embryology*, 5<sup>th</sup>ed, Thompson Brook, Coole.

**McEwen, R.s.** *Vertebrate Embryology*, Oxford and IBH Publishing Co. New Delhi.

### **Textbooks**

1. **A.K. Berry**, *A Text Book of Animal Physiology*, Delhi

#### Examples

Allen, T (1974) *Vanishing wildlife of North America*, Washington, D.C National Geographic Society  
Encyclopedia & Dictionary

#### Examples:

Bergmann, P.G. (1993) *Relativity*. In *The new encyclopedia britannica* (Vol.26, pp.501-508).

Chicago: Encyclopedia Britannica.

TI Storer & EJ Boell (2007). *Encyclopedia of study of zoology* (Vol.3) Asiatic Publishing House.

Allaby Michael (2003). *Oxford Dictionary of Zoology*, Oxford University Press.

Magazine & News Paper articles

#### Examples:

Harlow, H.F. (1983). *Fundamentals for preparing psychology journal articles*. *Journal of Comparative and Physiological psychology*, 55, 893-896.

#### Website or Webpage

##### Examples:

Devitt, T (2001, August 2) *Lightning injuries four at music festival The Why?*

Files. Retrieved January 23, 2002, from [http://whyfiles.org/137 lightning/index.html](http://whyfiles.org/137%20lightning/index.html).

**PARVATHANENIBRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE;  
VIJAYAWADA.**

(An autonomous college in the jurisdiction of Krishna University)

**IV SEMESTER END EXAMINATIONS  
II B.SC., ZOOLOGY PAPER – IV PAPER CODE: ZOO T41  
EMBRYOLOGY, ANIMAL PHYSIOLOGY AND ANIMAL ECOLOGY  
MODEL PAPER**

**Time: 3 Hours**

**Max. Marks: 75**

**SECTION –A**

Answer and **FIVE** of the following

**5x5=25 Marks**

Draw neat labeled diagrams wherever necessary.

1. Types of eggs CO1,L1
2. Fate maps of frog blastula CO2,L3
3. Structure of nephron CO2,L2
4. Absorption of lipids CO3,L2
5. Adrenal hormones CO1,L2
6. Phosphorous cycle CO3,L2
7. Ecotone and edge effect CO4,L2
8. Pelagic adaptations CO5,L1

**SECTION – B**

Answer any **FIVE** of the following

**5X10=50 Marks**

Draw neat labeled diagrams wherever necessary.

11. Write an essay on foetal membranes and their significance in chick embryo. CO1,L3  
OR  
Describe the process of gametogenesis CO1,L2
12. Explain the process of transportation of Oxygen through blood. CO2,L3  
OR  
Describe the structure and functioning of mammalian heart. CO2,L2
13. Write an essay on hormonal control of reproduction in human beings. CO3,L3  
OR  
Explain the propagation of action potential along myelinated and non-myelinated nervefibres. CO3,L2
14. Explain pressure as an ecological factor. CO4,L1  
OR  
Explain prey-predator relationships in animal communities. CO4,L3

15. Write an essay on the various adaptations of desert animals. CO5,L1  
OR  
Describe the physical features and fauna of Ethiopian region CO5,L3

**PARVATHANENIBRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE;  
VIJAYAWADA.**

(An autonomous college in the jurisdiction of Krishna University)

**PRACTICAL- IV (At the end of IV Semester)**

**Title: EMBRYOLOGY, ANIMAL PHYSIOLOGY AND ECOLOGY**

**No of Hours: 45  
02**

**Credits:**

**WEF: 2018-19**

**Course Code: ZOO P41**

- .CO1**Identify the reproductive organs in mammals. PO1, PO2, PO5, PO6, PO7, PSO3  
**CO2**Identify the different stages of cleavages and chick embryos. PO1, PO2, PO5, PO6, PO7, PSO3  
**CO3**Identify the carbohydrates, proteins and fats, ammonia, urea and uric acid and activity of salivary amylase from given sample. PO1, PO2, PO5, PO6, PO7, PSO3  
**CO4**To study prepared slides of T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage of a mammal. PO1, PO2, PO5, PO6, PO7, PSO3  
**CO5** Estimate the dissolved oxygen, total alkalinity, salinity and Determination of pH of given sample. PO1, PO2, PO5, PO6, PO7, PSO3

**I. Embryology**

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 cell stages)
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

**II. Physiology**

1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Qualitative tests for identification of ammonia, urea and uric acid
3. Study of activity of salivary amylase under optimum conditions
4. Study of prepared slides of T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage of a mammal

**III. Ecology**

1. Determination of pH of given sample
2. Estimation of dissolved oxygen of given sample

3. Estimation of total alkalinity of given sample

4. Estimation of salinity of given sample

**Suggested manuals**

1. Methods for chemical analysis of fresh waters, H.L.Golterman&Clymo.R.S

2. Methods for chemical analysis of fresh waters, H.L.Golterman&Clymo.R.S

3. Experimental physiology A.H.Siddiqi

4. An atlas of embryology Freeman & Bracegirdle

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10.**  
**ZOOLOGY FOURTH SEMESTER END PRACTICAL EXAMINATION QUESTION PAPER**  
**2<sup>nd</sup> Year B. Sc. PRACTICAL- IV, COURSE CODE: ZOO- P41**  
**Title of the Paper: Embryology, Animal Physiology and Ecology**

Time: 3hrs.

Max. Marks 40M

1. Identify any two organic substances (Proteins and Carbohydrates) present in the given tissue sample. Write the procedure and tabulate the results. CO1, L1 **10 M**

2 Estimate the **total Alkalinity** of the water sample. Write the procedure and tabulate the results. CO4, L3 **10M**

- i. Procedure 03
- ii. Experiment 05
- iii. Table 02

3. Identify, Classify, Draw diagrams and write notes on. CO2, L2

A. T.S of ovary      B. 18 hours chick embryo      C. T.S of liver      D. 2 cell stage of frog

4 X 2 ½ =

**10M**

1. VI VA      CO5, L2

**05M**

2. PRACTICAL RECORD BOOK      CO5, L3 **05M**



